REMARKS

In the present Amendment, claim 1 has been amended to incorporate the subject matter of claims 2 and 4. Claims 2 and 4 have been cancelled. Claims 3, 5 and 6 have been amended to depend from claim 1. Claim 21 has been amended to incorporate the subject matter of claims 22 and 24. Claims 22 and 24 have been cancelled. Claims 23, 25 and 26 have been amended to depend from claim 21. New claims 38 and 39 have been added. Section 112 support for claims 38 and 39 is found, for example, in paragraph [0069] of the specification. No new matter has been added, and entry of the Amendment is respectfully requested.

Upon entry of the Amendment, claims 1, 3, 5-9, 11-21, 23 and 25-39 will be pending.

In paragraph No. 3 of the Action, claims 1-9 and 11-37 are rejected under 35 U.S.C. § "102(e)" as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over Hsu et al (US 2002/0120082) or Halasa et al (US 2005/0131181).

Applicants submit that this rejection should be withdrawn because Hsu et al and Halasa et al do not disclose or render obvious the present invention.

Present independent claims 1 and 21 as amended recite that a content of the aromatic vinyl compound as a copolymer component is not more than 10% by mass.

In contrast, Hsu et al employed SBR with a ratio of styrene to 1,3-butadiene of 15:85 (15/85 SBR) in the Examples, and Halasa et al employed SBR where the ratio of styrene to 1,3-butadiene is 25:75 in the Examples.

Therefore, the present claims are not anticipated by Hsu et al or Halasa et al.

Further, as disclosed in paragraph [0036] of the specification, by limiting the styrene content (the aromatic vinyl compound content) in the modified conjugated diene polymer to be not more than 10% can be obtained a rubber composition having good wear resistance and excellent low heat buildup.

To demonstrate the unexpectedly superior results provided by the present invention, Applicants submit herewith a Declaration under 37 C.F.R. § 1.132 executed by Mr. Eiju Suzuki, a co-worker of the present inventors.

In his Declaration, Additional Example 1 with polymer F having a bound styrene content of 7.5% and Additional Comparative Example 1 with Polymer G having a bound styrene content of 15.7% were prepared.

As shown by the data in Table A at page 3 of the Declaration, when the content of the aromatic vinyl compound (e.g., styrene) is less than 10% by mass (Additional Example 1), the tan δ of the rubber composition was still low, i.e., the heat buildup was relatively low, and the wear resistance of the rubber composition was maintained.

In contrast, when the content of the aromatic vinyl compound is more than 10% by mass (Additional Comparative Example 1), the tan δ of the rubber composition was high, i.e., the heat buildup was large and the wear resistance of the rubber composition was deteriorated, even if the conjugated diene polymer had a polymer chain with at least one functional group represented by the formula (I) or (II).

Polymer (A) in Comparative Example 1 contained unmodified low-cis polybutadiene and Polymer (B) in Example 1 contained a low-cis polybutadiene rubber having at least one

functional group of specified amino group. In Example 1, the wear resistance was improved, and particularly the low heat buildup was largely improved, as compared with Comparative Example 1.

Hsu et al and Halasa et al do not teach or suggest the unexpectedly superior results provided by the present invention.

Accordingly, the present claims are not obvious and are patentable over Hsu et al or Halasa et al.

In view of the above, reconsideration and withdrawal of the §§102/103(a) rejection based on Hsu et al or Halasa et al are respectfully requested.

New claims 38 and 39, as well as claims 12 and 31, are patentable over Hsu et al and Halasa et al for at least the same reasons that claims 1, 3, 5-9, 11-21, 23 and 25-37 are patentable over Hsu et al and Halasa et al, as discussed above, and for additional reasons as follows.

Applicants disclose that when not less than 20% by mass of natural rubber and/or polyisoprene rubber is included in the rubber composition, the operability, fracture properties and low heat buildup are improved and the lowering of the wear resistance is suppressed. See paragraph [0070] of the specification.

Hsu et al and Halasa et al do not teach or suggest such unexpectedly superior results provided by the present invention.

Allowance is respectfully requested. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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Date: December 9, 2009

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of Satoshi MIKAMI, et al.
Application No.: 10/550,554
Filed: September 26, 2005
For: RUBBER COMPOSITION USING MODIFIED CONJUGATED DIENE POLYMER AND TIRE
Group Art Unit: 1796
Examiner: Peter D. Mulcahy
Confirmation No.: 1881

DECLARATION UNDER 37 C.F.R. § 1.132

I, Eiju Suzuki, declare that:

I am a co-worker of the inventors of the above-captioned patent application.

I received my Master of Science and Technology from Keio University in 2002, and have been employed by Bridgestone Corporation since 2002, where I have been engaged mainly in research and development of new polymers.

I have made the following experiments in order to evaluate a tan δ and a wear resistance of a rubber composition comprising:

(A) 100 parts by mass of a rubber component containing not less than 10% by mass of a conjugated diene polymer having a polymer chain with at least one functional group represented by the formula (I) or (II);

(B) not less than 20 parts by mass of carbon black and

(C) not more than 1.0 part by mass of a polycyclic aromatic compound (PCA),

wherein a content of the aromatic vinyl compound as a copolymer component is more or less than 10% by mass.

Experimental Procedure

<Production method of polymer F>

A polymer F is obtained in the same manner as in the Production method of polymer B described in paragraph [0084] of the present specification except that 46 g

of 1,3-butadiene monomer and 4 g of styrene are added instead of 50 g of 1,3-butadiene monomer. The resulting polymer F has a bound styrene content of 7.5%, a vinyl bond content in butadiene portion of 17% and a coupling efficiency of about 0%.

<Production method of polymer G>

A polymer G is obtained in the same manner as in the Production method of polymer B described in paragraph [0084] of the present specification except that 42 g of 1,3-butadiene monomer and 8 g of styrene are added instead of 50 g of 1,3-butadiene monomer. The resulting polymer G has a bound styrene content of 15.7%, a vinyl bond content in butadiene portion of 18% and a coupling efficiency of about 0%.

<Preparation of Rubber composition>

A rubber composition is prepared by compounding carbon black, stearic acid, antioxidant 6C, zinc oxide, vulcanization accelerator CZ and sulfur based on 100 parts by mass of the rubber component according to the kinds and amounts shown in the following Table A.

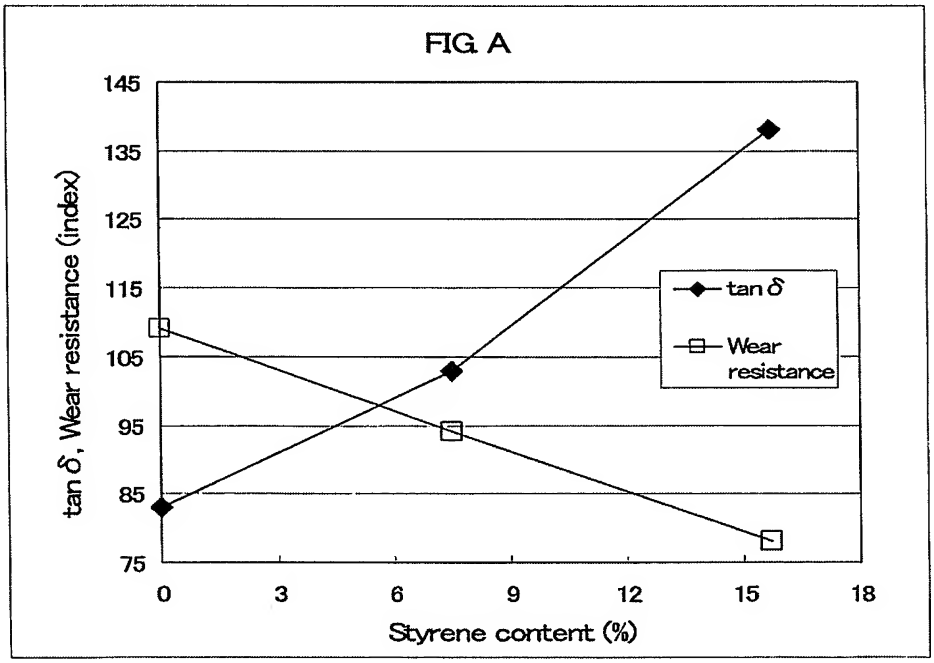
<Evaluation of properties of rubber composition>

With respect to the resulting rubber compositions, the tan δ and the wear resistance of the rubber composition are evaluated according to the methods described in paragraph [0082] in the specification of the present application. Results obtained from these experiments and the results of Comparative example 1 and Example 1 shown in the present specification are summarized in the following Table A. Further, the results of the Additional example 1, the Additional comparative example 1 and the Example 1 are plotted in the following FIG. A.

Table A

	Comparative Example 1	Example 1	Additional Example 1	Additional Comparative Example 1
Natural rubber	50	50	50	50
Polymer A (Styrene content: 0%)	50	-	-	-
Polymer B (Styrene content: 0%)	-	50	-	-
Polymer F (Styrene content: 7.5%)	-	-	50	-
Polymer G (Styrene content: 15.7%)	-	-	-	50
Carbon black	50	50	50	50
Softening agent A	-	-	-	-
Softening agent B	-	-	-	-
Stearic acid	2	2	2	2
Antioxidant 6c	1.5	1.5	1.5	1.5
Zinc oxide	3.5	3.5	3.5	3.5
Vulcanization accelerator CZ	1.4	1.4	1.4	1.4
Sulfur	1	1	1	1
PCA content	0	0	0	0
Tan δ	100	83	103	138
Improving width against no-modification	0	17	-3	-38
Wear resistance	100	109	94	78

FIG. A



(Summary)

As seen from the results of the additional comparative example 1, when the content of the aromatic vinyl compound, e.g., styrene, is more than 10% by mass, the tan δ of the rubber composition is high, i.e., the heat buildup is large and the wear resistance of the rubber composition is deteriorated, even if the conjugated diene polymer has a polymer chain with at least one functional group represented by the formula (I) or (II).

To the contrary, as seen from the results of the additional example 1, when the content of the aromatic vinyl compound is less than 10% by mass, the tan δ of the rubber composition is still low, i.e., the heat buildup is relatively low and the wear resistance of the rubber composition is maintained.

Thus, it is confirmed from the above results that the rubber composition comprising (A) 100 parts by mass of a rubber component containing not less than 10% by mass of a conjugated diene polymer having a polymer chain with at least one functional group represented by the formula (I) or (II), (B) not less than 20 parts by mass of carbon black and (C) not more than 1.0 part by mass of a polycyclic aromatic compound (PCA), wherein a content of the aromatic vinyl compound as a copolymer component is not more than 10% by mass, has a good wear resistance and an excellent low heat buildup.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under § 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: 12-07-2009 Declarant: 

Eiju Suzuki